hail storms accompanied the progress of the area thus far, but on the 12th, as the centre passed slowly northward, and a trough of low pressure extended southwestward to Texas, the most violent wind and hail storms of the month occurred. Very destructive tornadoes formed in eastern Kansas, western Missouri and southern Iowa. On the afternoon of the 12th this depression combined with area No. IV, then in Manitoba. On the afternoon of the 11th, cautionary signals were ordered for Milwaukee, Escanaba, Marquette and Duluth, and were justified, except at the latter station by winds of from 26 to 33 miles per hour.

No. IV.—Appeared to form over the Saskatchewan valley during the 11th and 12th, and by morning of the 13th, passing in a southeasterly course, was central over Lake Superior; Duluth and Marquette barometers 0.27 inch below the normal. The area of rain extended southward to the Ohio valley, and heavy rains, with southerly winds, were reported from the northern portion of Ohio. The rains were comparatively light, with westerly winds over the Upper Lakes. During the day centre passed eastward over Ontario, and on the morning of the 14th was central near Rockliffe; barometer 0.46 inch below the normal. Clear or fair weather, with westerly winds, prevailed at all Lake stations, except Kingston, where light rain was falling, wind south. During the day centre passed northeastward down the St. Lawrence, and by midnight was central near Father Point; barometer 0.44 inch below the normal. Morning of the 15th central over the Gulf of St. Lawrence; Chatham barometer 0.35 inch below the normal. During the afternoon the area passed beyond the limits of our charts.

No. V.—Appeared during the afternoon of the 15th over the Northern Rocky Mountain slope, and by midnight was central near Bismarck; barometer 0.26 inch below the normal. Occasionally heavy rains and numerous thunderstorms, with westerly winds, prevailed over the entire Northwest. Morning of the 16th central in Minnesota; St. Paul barometer 0.22 inch below the normal. During this day passed southeastward to southern Michigan, where by midnight it was central near Grand Haven; barometer 0.18 inch below the normal. The area of rain covered the entire Lake region and Canada; occasionally heavy rains fell over lower Michigan, and the severest thunderstorms for years prevailed throughout Ohio. Morning of the 17th central near Erie; through the night very heavy rains fell in western Pennsylvania and in Ohio. During the day centre passed northeastward over southern New York, and by midnight passed off the coast between Boston and Portland. During the passage of this storm over the Upper Lakes cautionary signals were ordered on the morning of the 16th at Milwaukee and Grand Haven, justified by W. 28 and S. 30 miles; at midnight, at Alpena and Port Huron, not justified; at Escanaba, Marquette and Duluth, at midnight of the 15th, all justified except at Duluth; along the Lower Lakes, at midnight of the 16th, from Detroit to Buffalo, and justified, except at Buffalo and Erie by NW. 30 miles at Sandusky. Along the Atlantic coast signals were ordered up at midnight of the 16th from Chincoteague to Sandy Hook, and at Kittyhawk and Cape Henry morning of the 17th; justified except at Kittyhawk and Sandy Hook by the following maximum velocities: Chincoteague, SW. 28; Delaware Breakwater, SW. 35.

No. VI.—Appeared to form during the 27th over the region south of Hudson's Bay; pressure below the normal over the entire Lake region and Ontario. Morning of the 28th central over Lake Superior; Marquette barometer 0.36 inch below the normal. During the day passed southeastward over the Province of Quebec, and by midnight was central in southwestern Maine; Portland barometer 0.51 inch below the normal. Light rains and thunderstorms prevailed over the Lake region and New England. Central morning of the 29th off the southwestern coast of Nova Scotia; Eastport barometer 0.65 inch below the normal, and Yarmouth 0.6 inch below. During the day skirted the eastern coast of Nova Scotia, and by midnight was central over Cape Breton Island; barometer at Sydney 0.8 inch below the normal. Light rains prevailed over the Maritime Provinces, with occasional thunderstorms and northeast to northwest winds. Cautionary signals were ordered along the Atlantic coast at noon of the 27th from Chincoteague to Sandy Hook, and in the afternoon from Cape Hatteras to Cape Henry. Justified at all stations, except Sandy Hook, by the following maximum velocities: Cape Hatteras, SW. 32; Kittyhawk, SE. 29; Chincoteague, SE. 26; Delaware Breakwater, SE. 32.

INTERNATIONAL METEOROLOGY.

International charts, Nos. V and VI, accompany the present REVIEW. Of the former, two are published, one for the month of July and the other for the month of August, 1877. This completes the series of chart No. V for the year 1877, which were first commenced in October of that year, and finally, as indicated in an explanation given in the leading paragraph under *International Meteorology* in the January, 1881, REVIEW, it was determined to commence with January and complete the entire year. Chart No VI is for July, 1879, and continues the series of this chart begun in October, 1877.

Chart No. V, for the month of July, 1877, shows the mean pressure, temperature, wind force and the prevailing direction of the wind at 7.35 a. m. Washington, or 0.43 p. m. Greenwich, mean time, over the Northern and at certain isolated stations in the Southern Hemisphere. The area of lowest

pressure, as indicated by the isobar of 29.70, lies off the coast of Norway, and skirts the north and west coasts of Scotland. This isobar in the previous month of June left the Norway coast at Tromso. Over Siberia the position of the area of low remains about the same as in June, except that the centre is more decided The pressure along the Asiatic coast is low, being from 0.03 to 0.05 inch below the mean of *June*. The area of 29.80, so long present over the Canadian Maritime Provinces, has finally passed to the northward, and probably covers the larger portion of British America north of parallel 50° and the southern half of Greenland. The pressure over British India has been uniformly low throughout the month, being somewhat below the mean of *June* in the northern Provinces, and above in the southern. The lowest pressures of the month were reported from the following stations: Roorkee and Lahore, 29.43 (747.4); Yeniseisk, 29.56 (750.7); Thorshavn, 29.64 (752.8); Peking and Stornaway, 29.65 (753.0 ; North Unst, 29.66 (753.3); Ninghai, 29.67 (753.5); Brono, Christiania, Sandwick Manse and Stykkisholm, 29.71 (754.5); York Factory, 29.74 (755.3); Godthaab, 29.78 (756.3). The areas of highest pressure cover in North America, the West Indies and the southeastern portion of the United States; in Europe, the southwestern portion, including Algeria, and thence eastward over the ocean to the 30th meridian; over which latter region the highest mean pressures of the month obtain. The highest pressures were reported from the following stations: Angra and Ponta Delgado, 30.35 (770.8); Melbourne, 30.30 (769.5); Valona and Mauritius, 30.24 (768.0); Funchal, 30.17 (766.2); Cape Town, 30.15 (765.7); Laghouat and Hobart Town, 30.13 (765.2); Geriville, 30.12 (765.0); Sfax and Mexico, 30.11 (764.7). The extreme monthly range of mean pressure is 0.92 inch, the largest since *February*, which was 0.94. The lowest temperatures given in Fahrenheit's scale were reported from the following stations: Godthaab, 44°; Melbourne, 48°; Stykkisholm and Hobart Town, 50°; Ft. St. Michaels, 51°; Thorshavn, North Unst, and Tromso, 54°; York Factory, 55°; Stornaway and Sandwick Manse, 56°; Nikolaievsk on the Amoor, 57°. The highest temperatures were repor ed from the following stations: Biskra, 104°; Lahore, 100°; Tunis, 99°; Laghouat, 98°; Agra, 96°; Geriville and Tabessa, 95°. The prevailing direction of the wind over the United States was *southwesterly* along the Atlantic coast and over the Lower Lake region; *variable* over the interior; *southerly*, shifting to *west* and *northwest* over the Upper Lakes and Upper Mississippi valley, and along the Pacific coast, *northwesterly*. Over the Eastern Hemisphere, *southwesterly* along the European coast, *westerly* in the interior; *southerly* over Russia and along the shores of the Baltic; *northerly* along the southern shore of the Mediterranean; elsewhere *variable*.

Compared with the preceeding month there has been a very general fall in pressure, extending entirely over Asia, and for the most part of Europe, the variation ranging from —0.02 to —0.15 inch. There has been a slight rise over the Mediterranean and in Spain. In the United States there has been a marked fall along the Pacific coast ranging from —0.04 to —0.07 inch, elsewhere a rise; over British America a decided fall, York Factory —0.20 inch; over the West Indies about stationary. At isolated stations the following changes occur: Angra, +0.18 inch; Ponta Delgado, +0.14; Hobart Town, +0.06; Free Town, +0.05; Godthaab and Mauritius, +0.04; Ft. St. Michaels, —0.06; Melbourne and Cape Town, —0.04; Stykkisholm, —0.03; Mexico, —0.02; Ft. Napier, no change. With respect to the temperature there has been the usual rise common to the summer months; the isotherm of 50° has disappeared from northern Europe, Asia and from British America, but reappeared over the North Atlantic, and if traced would pass through Stykkisholm and around the southern point of Greenland. York Factory reports a change of +17° and Ft. St. Michaels only +4°.

Compared with *July*, 1878, the pressure is much higher over southern Europe, the isobar of 30.10 occupying nearly the same position as did that of 30.00. Over northern Europe and in Asia the reverse prevails. Along the Asiatic coast it is about stationary. In British India there is a rise over the southern Provinces, while the reverse prevails to the northward. Over the United States t ere is a slight fall east of the 100th meridian, along the Pacific coast a rise, while over British America there is a slight fall. At isolated stations the following changes are noted: Hobart Town, +0.36 inch; Melbourne, +0.30; Ft. Napier, +0.16; Cape Town, +0.15; Mauritius, +0.12; Godthaab, +0.08; Mexico, +0.03; Free Town, +0.01; Paramaribo, no change; York Factory and Stykkisholm, —0.05. With respect to the temperature there is a slight and irregular fall over southern Europe and northern Africa, but over northwestern France and the British Isles there is a change of from —2° to —5°. Over central Europe and Russia a large rise varying from +5° to +14°. Over Siberia a fall from —4° to —8°. Along the Asiatic coast a rise of from +1° to +4°, except at Nikolaievsk on the Amoor, where there is no change. Over British India it is generally higher. In the United States there is a slight fall along the Gulf coast, over the Lower Lake region and in the Middle Atlantic states; elsewhere about stationary. Over British America, between the 50th and 60th parallels, a considerable fall. At isolated stations the following changes occur: Mexico, —11°; Cape Town, —6°.5; York Factory, —4°; Hobart Town, —3°.6; Stykkisholm, —3°.2; Paramaribo, —1°.7; Ft. Napier, —1°.5; Melbourne, —0°.9; Godthaab, no change; Mauritius, +0°.5; Free Town, +2.6.

Chart No. V, for the month of August, 1877, shows the mean pressure, temperature, wind force and the prevailing direction of the wind at 7.35 a. m., Washington, or 0.43 p. m., Greenwich, mean time, over the Northern, and at certain isolated stations in the Southern Hemisphere.

The area of lowest pressure, as indicated by the isobar of 29.80, covers the British Isles north of the 53d parallel, the southern half of Norway, Finland, northern Russia and Siberia. This area over North America, apparently very much smaller in extent, lies just to the northward of York Factory, Hudson's Bay. Over British India the pressure was uniformly low, but lowest over the Punjab. The lowest pressures of the month were reported from the following stations: Lahore, 29.43 (747.4); Vladivostock, 29.71 (754.5); Archangel, 29.73 (755.1); Kuopio and Yeniseisk, 29.76 (755.8); Vestervig and Peking, 29.78 (756.3 . The areas of highest pressure cover southern Europe, Algeria and the southeastern portion of the United States. The highest pressures of the month, including isolated stations, were reported as follows: Mauritius, 30.24 (768.0); Melbourne, 30.20 (767.0); Mexico, 30.17 (766.2 : Cape Town, 30.15 (765.7); Funchal, Valona and Laghouat, 30.10 (764.4); Biskra and Sfax, 30.08 (763.9). The extreme monthly range of mean pressure is 0.81 inch or 0.11 below that of *July*. At isolated stations the temperatures given in Fahrenheit's scale were reported as follows: lowest, Hobart Town, 46°; York Factory, 47°; Godthaab, 48°; Melbourne, Tromso, Thorshavn and Stykkisholm, 50°; highest, Lahore, 103°; Biskra, 101°; Agra, 98°; Laghouat, 95°; Deesa and Lucknow, 94°. The prevailing direction of the wind was, over the United States *southwest* to *northwest* along the Atlantic coast, *variable* over the interior and *southwesterly* along the Pacific coast. Over Algeria the winds were *northerly*, over Spain, France and Great Britain, *southwest* to *northwest*; over Scandinavia, *northeast* to *northwest*; elsewhere *variable*. Compared with the preceding month there has been a slight fall in pressure over Algeria, the influence extending with more emphasis over Europe south of the 55th parallel and west of the 20th meridian, where a variation of from —0.02 to —0.15 inch obtained, the greatest deviation being found over Ireland, England and eastward to Denmark. Over Scotland, Scandinavia and eastward to the 40th meridian the pressure has risen, the variation ranging from +0.04 to +0.18 inch, the greatest change occuring along the coast of Norway and to the north of Scotland. Over eastern Asia there is a slight fall followed to the south and east by a rise at nearly all stations. Over British India there has been a general rise of from +0.02 to +0.07 inch. Over the United States little or no change has taken place except a slight rise in the Northwest, which increases to the northward and extends beyond Hudson's Bay. Along the Pacific coast there is a *rise of 0.02 to 0.05 inch*. At *isolated stations the following changes occur*: Angra, —0.32 inch; Ponta Delgado, —0.29; Hobart Town, —0.26; Melbourne, —0.10; Ft. Napier, —0.08; Funchal, —0.07; Free Town, —0.01; Cape Town and Mauritius, no change; Paramaribo, +0.01; Mexico, +0.06; York Factory, +0.07; Peking, +0.13; Yeniseisk, +0.20; Barnaul and Godthaab, +0.24; Stykkisholm, +0.27. With respect to the temperature, there is a general rise over Europe of from 2° to 10° from Algeria northward to the 50th parallel, while to the northward of that boundary a very decided fall of from 4° to 15° prevails, with the greatest change over northern Russia and Scandinavia. Over British India there is a slight but general rise; along the Asiatic coast a fall of from 2° to 8°, except at Nikolaievsk on the Amoor, where there is no change. Over the United States the fall has been general, but most marked north of the 40th parallel, where the change varies from 3° to 9°. This fall continues to the northward, spreading over Hudson's Bay Territory, where, at York Factory, a change of —8° is reported. Compared with *August*, 1878, the pressure over Europe is generally higher, the change ranging from +0.03 to +0.12 inch, the greatest deviation occurring along the Mediterranean and in Algeria. Over Asia the rise is more decided, ranging from +0.05 to +0.25 inch, but this marked deviation rapidly diminishes as you approach the Asiatic coast, where, at some stations, there is a slight fall. In British India a fall at southern stations, followed by a rise over the northern Provinces. Over the United States the rise in pressure is very marked east of the 100th meridian and particularly over the southeastern portion; this change continues northward, and reaches beyond the 50th parallel. Along the Pacific coast but little change is noted. At *isolated stations the following changes occur*: *Godthaab*, +0.20 inch; Melbourne and Hobart Town, +0.18; Mauritius and Stykkisholm, +0.11; Ft. Napier, Free Town and Paramaribo, no change; York Factory, —0.06; Cape Town, —0.10. The temperature is generally lower over Europe north of parallel 50° and south of parallel 40° and in Algeria. Between these parallels there appears a very irregular belt of country over which a rise of from 3° to 10° occurs. Over northern Asia there is a fall of from 1° to 9°; in British India a general rise of from 2° to 15°, except at the most southern stations, where a fall of about 5° is reported. Over the United States there is a general and decided fall east of the 100th meridian, and in the Pacific coast states; elsewhere but little change. Isolated stations report the following changes: Hobart Town, —8°; York Factory, —5°.4; Stykkisholm, —2°; Free Town, —0°.9; Mauritius, —0°.8; Melbourne, *no change*; Paramaribo, +0°.7; Godthaab, +4°; Ft. Napier, +5°; Cape Town, +6°.

Chart No. VI.—Upon this chart are located eighteen of the principal storm areas of the Northern Hemisphere during the month of July, 1879. Of these, five originated within the United States and west of the 100th meridian; two of which passed over the ocean to the mainland of Europe, the remainder disappearing off the Atlantic coast. Six originated over British America between the 50th and 60th parallels; two of which passed over the ocean to the mainland of Europe. Two first appeared over the ocean to the west of the British Isles, passing thence eastward to the Continent. Two commenced their formation over southern Russia, and passed thence east and *northeast into central Siberia*. Two formed over the central portion of the Chinese empire, and

one over the northeastern part. Concerning the storms of North America, the following is a concise description of the paths or translation of the various low areas: No. I first appeared on the South Pacific coast during the 1st, and moved thence east-northeast, reaching northern Colorado by the 2nd. From this locality its course changed to the north-northeast, while it moved to the Lake region during the 3rd. On this day exceedingly violent storms were experienced in Dakota and the states of Iowa, Minnesota and Wisconsin, destroying a large amount of property and causing the loss of many human lives. Over the Upper Lake region the winds were not unusually high, although the pressure was abnormally low. On the morning of the 4th the centre was in the Lower St. Lawrence valley, where the pressure fell very rapidly and the winds increased to gales. During this day the centre moved eastward to the Gulf of St. Lawrence, and thence northeastward over Newfoundland to about 56°, N., 50°, W., which locality it reached by the 5th. The barometer at Godthaab, which had been quite low for several days, fell rapidly on the 4th, but reached its lowest point (29.39 on the morning of the following day, while the storm centre lay to the south. On the 5th, in 54°, 30′ N., 24°, 40′ W., barometer 29.77, south-southwest gale and heavy rain. From this position the storm pursued an easterly path, reaching the north of Scotland on the 8th. On the 6th the barometer at Godthaab rose to 29.62, and the rain (which had been reported since the 4th) ceased. 6th, in 54°, 35′ N., 27°, 58′ W., steamer *Johnson* experienced terrific gale from WNW., lasting 24 hours; in 53°, 46′ N., 22°, 46′ W., heavy westerly gale, high seas; in 56°, N., 19°, 35′ W., southeast gale, barometer 29.33; in 51°, 08′ N., 23°, 08′ W., strong westerly gale, threatening, heavy west sea; at Stykkisholm the barometer had fallen 0.27 inch since the preceding morning, wind remaining east but increasing to a heavy gale; at nearly all stations over the British Isles the barometer rose quite decidedly as the storm approached from the west. On the 7th, in 50°, 44′ N., 27°, 16′ W., steamer *Baltimore* experienced heavy west and west-northwest gales, with high seas; in 53°, 06′ N., 25°, 12′ W., heavy westerly gales, terrific squalls, very heavy west sea; in 48°, 46′ N., 30°, 09′ W., steamer *Erin* experienced strong westerly gales and high west sea; in 50°, 55′ N., 13°, 28′ W., steamship *Abyssinia* experienced strong west and west-northwest gales, very heavy west sea; in 57°, 45′ N., 14°, 15′ W., barometer 29.03, strong southwest gale, with rain; at Stykkisholm the wind had changed to north, fresh, barometer 29.50—a fall of 0.17 inch in past 24 hours; along the western coast of the British Isles the winds were southwest, strong, with occasional light rains, while the barometer at most stations had fallen quite decidedly; over the islands to the north of Scotland the winds shifted to southeast and northeast, with marked barometric falls: Thorshavn, barometer 29.32, wind NE.; Nairn, 29.36, W.; Aberdeen, 29.39, WNW.; Sandwick Manse, 29.35, W.; Glasgow, 29.46, WSW.; Ardrossan, 29.48, SW. 8th, in 49°, 55′ N., 33°, 50′ W., northwest to southwest heavy gale, high seas; in 51°, 38′ N., 31°, 27′ W., decreasing west-southwest gale, high seas; in 51°, 44′ N., 18°, 46′ W., heavy westerly gale, high confused sea; in 49°, 22′ N., 18°, 22′ W., WSW., violent storm, very high sea; in 50°, 25′ N., 17°, 51′ W., strong WSW. and W. gales, heavy beam sea; in 58°, 45′ N., 11°, 30′ W., barometer 29.21, wind NE., strong; at Stykkisholm the barometer had risen 0.26 inch, wind shifting to east. The circulation of the winds, as well as the relative pressure of adjoining stations, showed the storm centre on this date to be over the north of Scotland, lowest barometer at Ardrossan 28.98, wind SSW. At other stations the following low pressures were reported: Aberdeen, 29.06, S.; Nairn, 29.01, calm; Silloth Rectory, 29.10, SW.; Sandwick Manse, 29.11, E.; Bolton, 29.20; Stonyhurst, 29.21, SSW., squally; Holyhead, 29.21, SSW., raining; Bradford, 29.22, W; at nearly every station the barometer was below 29.50, the highest (29.94) being reported from Donaghadee. Along the southern coast of Ireland the winds shifted to west, and over southern England to south and southwest, increasing to gales; over the islands to the north of Scotland the winds were from southeast to northeast; at Thorshavn, barometer 29.35, indicating a slight rise since the day before. 9th, storm centre passed eastward over the North Sea, winds over the British Isles shifted to north and west, with rapidly rising pressures and clearing weather, the change in barometer ranging from +0.15 to +0.42 inch, the lowest barometer (29.37) occurring at Aberdeen, Bradford and Silloth Rectory. The centre of lowest pressure on this date appeared to be near the southern coast of Norway; Bergen, 29.28, NW.; Haparanda, 29.28, NE.; Tromso, 29.33, NE.; Brono, 29.35, N.; Christiania, 29.35, SW.; Umea, 29.34, W.; Hernosand, 29.33, SW. 10th, depression slowly filling up, centre near Christiania, barometer 29.36, SSW.; Bergen, 29.37, WNW.; Fanöe, 29.38, NE.; Vestervig, 29.39, NNW.; at other stations in Scandinavia the barometer remained about stationary or rose slightly. Over the British Isles and France northwesterly winds very generally prevailed. The area of rain extended southward over Denmark into central Germany, where the barometer ranged from 29.39 to 29.93. During the 10th the depression moved eastward in an irregular path, and on the morning of the 11th the circulation of the winds and the relative pressure of adjoining stations showed the centre to be in the vicinity of St. Petersburg, where the lowest reading (29.11) occurred; Dorpat, 29.12, SW. rain; stations in Norway showed a change in pressure of from +0.04 to +0.19 inch, while over Sweden the barometer remained about stationary, with a slight tendency to fall; the greatest variation (—0.05 inch) occurred at Umea. 12th, depression moved northeastward to the White Sea: barometer at Archangel 29.38, SW. rain. The area of cloud and rain became more general, but the centre began to fill up quite rapidly, although the depression did not wholly disappear, as on the 13th an area of low, enclosed by the isobar of 29.80,

appeared in the vicinity of Kasan, barometer 29.75, wind SE; Archangel, 29.84, W.; Moscow, 29.80, W.; Krotkowo, 29.77, S.; Ekaterinburg, 29.95, S. 14th, centre of depression more decided and situated between Kasan and Ekaterinburg; at former barometer 29.54, WSW.; at latter 29.85, SE.; Krotkowo, 29.58, W. 15th, about stationary; Ekaterinburg, 29.64, E.; Kasan, 29.59, SW.; Krotkowo, 29.64, NW. 16th, depression moved very slowly eastward and apparently enlarged; Ekaterinburg, 29.37, E.; Kasan, 29.48, WSW.; Krotkowo, 29.57, NNW. 17th, moved east-northeast to the Valley of the Obi; Ekaterinburg, 29.50, S.; Barnaul, 29.52, SSE.; Yeniseisk, 29.75, S. 18th, moved eastward between Barnaul and Yeniseisk; barometer at latter, 29.71, NE.; at former, 29.55, SE. 19th, disappeared to the southeastward over China; Yenisiesk, 29.73, N.; Barnaul, 29.63, SSW. No. II, a continuation of low area No. XXII, traced on the *June* chart published in the *May* (1881) REVIEW, appeared on the 1st in Manitoba. Ft. Garry, barometer 29.39, wind NW.; Pembina, 29.51, WNW.; York Factory, 29.54, SSE. 2nd, depression slowly filling up, centre moved eastward to near the 90th meridian; York Factory, 29.66, E.; Ft. Garry, 29.84; Pembina, 29.80, W.; winds over the Upper Lake region shifted from southeast to southwest and west, with falling pressure; over the Canadian provinces the pressure fell more rapidly, with winds shifting to south-southwest and southeast. 3rd, centre probably over the southern portion of James' Bay; the isobar of 29.60, which previously covered a small portion of the country just south of Hudson's Bay disappeared, being replaced by that of 29.80, which embraced a very large extent of territory, including the Maritime Provinces, the country north of Ontario and from Hudson's Bay southwestward to Texas. 4th, combined with low area No. I, then in the Lower St. Lawrence valley. No. V first appeared on the 3rd in the Sacramento valley, and moved thence northeastward over the territories of Idaho, Montana and Dakota, reaching Manitoba on the 7th. During the 4th, 5th and 6th unusually heavy rains and terrific hail and thunderstorms visited this section of country, causing much loss to property; abnormal barometric falls were reported from nearly all stations. 7th, isobar of 29.60 extended in a narrow trough southwestward from Hudson's Bay to Texas; lowest barometers reported as follows: Dodge City, 29.37, SSW.; North Platte, 29.29, E.; Omaha, 29.58, SSW.; Breckenridge, 29.58, SSW.; Pembina, 29.45, W.; Fort Garry, 29.48, W. 8th, central over the province of Ontario; lowest barometers at Parry Sound and Rockliffe; the pressure west of the 90th meridian rose rapidly, except at York Factory, where a fall of 0.11 inch was reported; the area of rain extended southward to the Ohio valley and southeastward to the Atlantic ocean. 9th, central over the Gulf of St. Lawrence; Father Point, 29.54, S.; Cape Rozier, 29.52, calm; Chatham, 29.52, S.; area of rain confined to the Maritime Provinces. 10th, centre transferred to the ocean southeast of Nova Scotia, the isobar of 29.60 still covering nearly the whole of the Maritime Provinces; in 40°, N., 56°, W., 29.64, SSW.; in 44°, 38′ N., 45°, 58′ W., steamship *Erin* reported strong southerly gale, high sea. 11th, centre probably southeast of Newfoundland; barometer rose slowly over the Maritime Provinces, with clearing weather; in 46°, 08′ N., 36°, 56′ W., west-southwest to southeast gales, heavy rains and high westerly sea; in 41°, 35′ N., 61°, 15′ W., southwest strong, barometer 29.70; in 40°, 20′ N., 53°, 40′ W., west fresh, barometer 29.77. 12th, depression passed slowly eastward; in 44°, 10′ N., 43°, W., southerly gale, fog and heavy rain; in 47°, 10′ N., 41°, W., SW. brisk, overcast and rain. 13th, depression about stationary and imperfectly defined; in 43°, 14′ N., 48°, 52′ W., southerly gale, fog and heavy rain; in 49°, 20′ N., 41°, 10′ W., northeast, overcast and rain; in 42°, 30′ N., 47°, 35′ W., SSW. 29.80. 14th, depression passed northeastward, but still very poorly defined; in 46°, 08′ N., 43°, 09′ W., NW. violent gale, overcast and rain; in 46°, 45′ N., 40°, 35′ W., WNW. strong gale, high confused sea; in 48°, 03′ N., 43°, 10′ W., hurricane from the north, heavy sea, overcast and rain; in 47°, 03′ N., 42°, 07′ W., hurricane from the north, overcast and heavy rain; in 46°, 09′ N., 36°, 08′ W., violent southwest gale. 15th, depression moved eastward to near 50°, N., 25°, W.; in 50°, 20′ N., 26°, 15′ W., 29.58, northwest brisk; in 48°, 35′ N., 32°, 15′ W., 29.70, northwest brisk; in 46°, 48′ N., 39°, 08′ W., strong WNW. gale, high confused sea; in 45°, 31′ N., 25°, 56′ W., increasing storm, thick rain, high sea; in 48°, 04′ N., 27°, 43′ W., southwest to northwest strong gale, threatening high sea; in 48°, 04′ N., 32°, 30′ W., southwest to west-northwest fresh to strong gale, very heavy head sea; in 48°, 02′ N., 26°, 06′ W., violent westerly gale, heavy rain; in 41°, 02′ N., 29°, 09′ W., WSW. fresh, overcast and rain. 16th, depression moved northeastward to the Irish coast; in 51°, 01′ N., 8°, 04′ W., violent southeast gale, high sea and heavy rain; in 50°, N., 6°, W., south, strong gale, heavy rain; the area of rain covered the southern portion of the British Isles and northwestern France, reaching thence westward over the ocean; Valencia, 29.56, E.; Roche's Point, 29.69, SE.; there were no marked barometric falls reported from the English and French stations. 17th, depression passed southeastward over the English channel into northern France; the winds over the British Isles shifted from southeast and southwest to northeast and northwest, and along the western coast of France from south to west; lowest barometer at Paris, (Montsouris Observatory,) 29.54; the pressure was generally below 29.90 over the whole of western Europe, with no marked depression in any quarter; on this and the following day the depression gradually filled up over central Europe. No. VI.—This storm first appeared over the southern portion of the Northern Plateau on the 7th, and proceeded in an irregular easterly course across the United States, reaching the Atlantic coast on the 12th. Very heavy rains accompanied the course of the storm on the 10th in Minnesota and Wisconsin, and on

the 11th very violent and destructive local storms visited portions of Michigan, Ohio, Canada, Pennsylvania and Maryland. Very low pressures were reported along the Middle and South Atlantic coasts during the 11th and 12th, ranging from 0.36 to 0.48 inch below the normal, but no very high winds occurred, highest 46 NW. at Cape Henry). After passing off the Middle Atlantic coast on the 12th, the storm pursued a peculiar course; turning to the southwest, it skirted the coast of the South Atlantic states, where the highest temperatures ever known in that section were experienced. On the 13th, moved again to the east, near the 30th parallel, and disappeared over the ocean. No. VII.—During the 10th, falling barometer, with rain, prevailed along the North Pacific coast, extending by morning of the 11th, over the Middle and Northern Plateau regions, and northward over British Columbia. On this day and the following, the pressure was abnormally low over these regions, and violent wind storms, with heavy rains, occurred in several localities. During the 12th, centre moved northeastward to Manitoba, Ft. Garry, 29.67, S. 13th, passed eastward north of Lake Superior, and thence southeastward over the Province of Ontario. 14th, central in the Lower St. Lawrence valley, lowest pressure at Montreal. 15th, passed eastward over the Canadian Maritime Provinces, reaching the ocean on the 16th, where it was central south of Newfoundland; in 42° 40′ N. 58° 35′ W., calm, heavy rain; Sydney, C. B., 29.61, calm, heavy rain; on this day the isobar of 29.80 covered the ocean eastward to the 35th meridian and westward over Canada to Hudson's Bay. 17th, this area combined with low area No. X, then central over Nova Scotia. No. X.—This area first appeared on the 14th over the region between Manitoba and Hudson's Bay, and was probably a secondary development of low area No. VII during its passage eastward on the 13th near parallel 50° N. 14th, York Factory, 29.58, E., Ft. Garry, 29.71, W. 15th, depression passed slowly southeastward: York Factory, 29.57, NE., Ft. Garry, 30.00, WNW. 16th, central in the Lower St. Lawrence valley. 17th, depression covered the Canadian Maritime Provinces, lowest pressures over New Brunswick and Nova Scotia; St. Andrews, 29.45, calm; St. Johns, N. B., 29.46, E., Charlottetown, P. E. I., 29.48, E.; at Heart's Content, Newfoundland, 29.71, NE., strong; in 46° 15′ N. 50° W., NE., threatening; in 41° 45′ N. 33° 35′ W., SW., strong, heavy rain. 18th, centre passed off the Nova Scotia coast and thence northeastward over the ocean to near the 50th parallel; in 46° 40′ N. 50° W., 29.55, SW., brisk; in 43° 35′ N. 50° W., 29.61, SW., strong gale; in 44° 08′ N. 47° W., south, heavy rain; in 45° 04′ N. 46° 08′ W., south, strong gale, heavy rain; in 41° N. 55° 03′ W., SW. violent gale, heavy rain and lightning. 19th, depression passed rapidly eastward over the ocean to near the 25th meridian, where it combined with an area of low pressure slowly forming in that vicinity. The pressure over this portion of the ocean had not yet recovered from the recent passage southeastward of low area No. V, the barometer remaining below 29.80 since the 16th. In fact, on the 18th, the isobar of 29.80 appeared to cover the ocean from Newfoundland to near the Irish coast, although the reports to date were too meagre to make the position of the line positive. On the 19th, the winds along the western coast of the British Isles were from the south and southwest, and rain fell at most stations in England and Scotland. 20th, depression passed eastward, covering the British Isles, where rain or threatening weather prevailed throughout the day; lowest barometers were reported as follows: Bidston, Bolton and Stonyhurst, 29.18; Nottingham and Holyhead, 29.23; Oscott and Silloth Rectory, 29.24; Sheffield, 29.25; Leicester, 29.26. The pressure at all stations except those on the southwest coast of Ireland were below 29.60. 21st, centre passed eastward over the southern portion of the North Sea; the winds over the British Isles shifted to north and northwest, but rain or threatening weather still continued. At Ipswich, surrounding country flooded to the greatest depth ever recollected; loss of property very great. At Helesworth the rain came down in sheets, flooding everything. At Framlington, greatest flood in past fifty years At Berwick on Tweed, incessant and heavy rain for four days; very heavy westerly gales continued on the west coasts. The pressures along the southeastern coast of England and along the coasts of Holland, Belgium and Denmark were quite low, the variation in the past 24 hours ranging from —0.08 to —0.43 inch. Great Yarmouth, 29.24, NW.; Cambridge, 29.36, WNW.; Helder, 29.17, SSW.; Groningen, 29.22, S.; Utrecht, 29.26, SW. The winds over Europe circulated with marked regularity about the area of low, which apparently controlled the movements of the atmosphere over a large extent of territory. 22nd, depression remained about stationary, with very little change in the direction of the winds or the extent of the area of rain. 23rd, moved slowly northeastward over northern Prussia to the Baltic; Wisby, 29.51, E., rain; Upsala and Stockholm, 29.60, NNE., rain; Christiania, 29.65, NNE., rain. Over Denmark and Prussia the winds were westerly, and in western Russia from the southeast. 24th, central over southern Sweden; Wisby, 29.44, SSW., rain; Upsala, 29.48, ENE.; Stockholm, 29.47, E., rain; Copenhagen, 29.57, WNW., rain; Christiania, 29.54, NNE. 25th, centre passed northeastward to the Gulf of Finland, followed over Denmark, Prussia, and southern Sweden by high west to northwest winds and rising pressure; St. Petersburg, 29.26, ESE., rain; Dorpat, 29.39, SW., rain. 26th, depression passed slowly eastward, lowest barometer still at St. Petersburg, 29.43, NW.; Moscow, 29.48, SSW.; Archangel, 29 57, E. 27th, moved eastward between the 50th and 60th meridians; Moscow, 29.47, E.; St. Petersburg, 29.55, NE.; Archangel, 29.63, NE.; Kasan, 29.52, SW.; Krotkowo, 29.58, SW.; Ekaterinburg, 29.46, calm. 28th, depression slowly filling up, isobar of 29.60 replaced that of 29.40. 29th, barometer falling at all stations between the 50th and 90th meri-

dians and north of the 40th parallel; area of 29.60 greatly enlarged; centre of depression not easily located. 30th, centre probably in the valley of the Obi, lowest barometer at Barnaul, 29.42, ENE.; Yeniseisk, 29.69, E. 31st, depression passed to the northeastward north of the 60th parallel; Barnaul, 29.42, SE.; Yeniseisk, 29.54, SE. No. XII, first appeared over the region west of Hudson's Bay on the 19th; York Factory reported a change of —0.30 inch in barometer during past 24 hours, wind shifting from west to south-southwest. 20th, centre passed eastward along the 60th parallel; York Factory, 29.53, a fall of 0.14 inch, wind S. 21st, depression moved slowly northeastward; York Factory, 29.73, or +0.20 inch, wind SW. 22nd, disappeared to the eastward over Baffins Bay and Greenland in a high pressure area there prevailing. No. XIII.—This area appeared on the 21st in Wyoming Territory, and moved thence rapidly in an irregular easterly course, passing the Lake region on the 23rd and disappearing off the coast of Newfoundland on the 25th. This storm displayed very little energy throughout its entire course. The greatest variations of pressure were reported from stations along the valley of the St. Lawrence, and heaviest precipitation from various points in New England. No. XV, first appeared in Manitoba on the 25th, Ft. Garry, 29.61, SSW.; Pembina, 29.57, W.; York Factory, 29.71, SE. 26th, central over Lake Superior, lowest barometer at Marquette and Escanaba: thus far the storm was accompanied by light local rains and considerable variations of pressure. During this day the depression passed southeastward over Lakes Michigan and Huron, and thence eastward over the southern portion of Ontario, leaving the New England coast on the morning of the 27th. Along the Atlantic coast, as far south as North Carolina, brisk to high winds were reported, and heavy rain falls occurred at New England stations. 28th, central off the eastern coast of Newfoundland, Heart's Content, 29.57, S., heavy rain; over the Canadian Maritime Provinces and southward, as indicated by several ocean reports, the winds were from northwest to southwest, accompanied by rising pressure; in 42° 07′ N. 58° 09′ W., NW. strong, rain; in 45° 07′ N. 44° 08′ W., NE. light, rain; in 42° 09′, N., 60° 02′ W., WNW. gale, rain: in 43° N., 54° 06′ W., WSW. hurricane, rain; in 41° 09′, N., 54° 03′ W., west violent gale, rain. 29th, the isobar of 29.80 apparently covered the ocean north of the 50th parallel, from Newfoundland to the British Isles, the centre of depression being probably situated a little to the southeast of Greenland: Godthaab, 29.90, WSW. fair; Stykkisholm, 29.57, NNE. light rain; in 50° 45′, N., 22° 35′ W., 29.99, WNW. fair; in 49° 04′, N., 21° 02′ W., 29.92, NW. rain; in 48° 06′ N., 11° 03′ W., 30.04, S. fair; in 47° 09′ N. 12° 03′ W., 29.91, S. cloudy, rainy weather; although the central portion of the storm was about two days distant, the winds over the British Islands were sensibly affected by the presence of this extremely elongated area of depression, the prevailing direction being from the south. 30th, centre passed slowly northeastward, and probably reached a position a little to the west of Iceland; Godthaab, 29.78, SW. threatening; Stykkisholm, 29.51, SE. light rain: the pressure to the southeast and west had risen very rapidly, forming areas of 30.20 over Hudson's Bay and to the east of Newfoundland. The former higher area passed rapidly to the eastward during the 30th, preceded by a movement to the southeastward of the depression, which was central on the morning of the 31st over Ireland, lowest barometers, 29.73 at Valencia and Holyhead; over England and Scotland the winds were from south to east, over Ireland northeast and north, and over northern France from southeast to southwest: rain or threatening weather prevailed over the British Isles during the day. No. XVI.—Before low area No. XV had left the Atlantic coast, and while the isobar of 29.80 still covered the country north of the 45th parallel from Manitoba southeastward to the New England coast, the pressure on the 27th began again to fall to the north of Lake Superior, the changes being quite small, ranging from —0.03 to —0.06 inch, but the precipitation was very heavy. 28th, central north of Lake Huron, accompanied by northwest to southwest winds, and slowly rising pressure over the southern and western portions of the Upper Lakes. During the day the depression passed eastward over the provinces of Ontario and Quebec, and thence northeastward to the Gulf of St. Lawrence, which it reached by the morning of the 29th, and thereafter disappeared in an area of high pressure to the eastward of Newfoundland. The passage of this storm was marked by no exhibition of decided energy. No. XVIII.—This area was probably central on the morning of the 30th in the Saskatchewan valley; southerly winds and slowly falling pressure prevailed along the northern boundary of the United States, between the 90th and 110th meridians; during the day the depression passed slowly southeastward into the Lower Missouri valley, where it was central on the morning of the 31st. Its further course will appear on chart No. VI, for the month of *August*, 1879. Concerning European storms the following descriptions are given: No. III, appeared on the 1st over the central portion of the British Isles. Donaghadee, 28.98, SSW.; Ardrossan, 29.03, SE.; Silloth Rectory, 29.10, W.; Galway, 29.13, WNW.; Holyhead, 29.14, SSW.; Bolton, 29.15, SW.; Bidstan, 29.16, SW.; threatening weather or rain prevailed over the Islands during the day; winds mostly from southwest to southeast. 2nd, central on the northwestern coast of Scotland; Nairn, 28.90, ESE.; Aberdeen, 28.94, SW.; North Unst, 29.03, SE.; Glasgow, 29.09; Ardrossan, 29.12; threatening weather or rain still prevailed, but the winds shifted to west and southwest over England and Ireland. 3rd, centre passed to the north of Scotland; North Unst, 29.97, S.; Monach Lighthouse, 29.01, WNW.; Nairn, 29.02, W.; Aberdeen, 29.12, SSW.; rain still continued at most stations, pressure slowly falling, while the winds shifted more to the west and northwest. 4th,

centre passed east-northeast to near the coast of Norway, followed by rising pressure and west to northwest winds over the British Isles, but rainy or threatening weather still continued at many stations. 5th, depression central over the southern portion of Scandinavia, accompanied by west to southwest winds over northern Germany and Denmark, and northeast winds over the northern portion of the Peninsula: Upsala, 29.35; Stockholm, 29.36; Christiania, 29.38; Copenhagen, 29.39. 6th, depression central over the Baltic; Stockholm, 29.36, NE.; Wisby, 29,37, W. 7th, central south of the Gulf of Finland, followed by westerly winds and rising pressure along the eastern coast of the Baltic; Wilna, 29.20, NW.; St. Petersburg, 29.46, NE. rain; Dorpat, 29.42, NE. rain; Moscow, 29.30, S. 8th, passed northeastward beyond the Gulf of Finland; St. Petersburg, 29.25, WSW. rain; Wilna, 29.60, WSW. rain; Archangel, 29.40, E. rain. 9th, passed northeastward beyond the White Sea; Archangel, 29.38, S. 10th, Archangel, 29.45, SW. The lowest pressures of the month accompanied the progress of this area over the British Isles. No. VIII.—On the 12th a small area of low pressure (29.60) formed off the northwest coast of Ireland. To the south and east over the British Isles the winds were from northeast to southeast, and at most stations accompanied by rain; the barometer was not very low, but the change in the past 24 hours was large, ranging from —0.18 to —0.40 inch. 13th, central over England; Oxford, 29.43, ESE.; Bolton, 29.45, ENE.; Cardington, 29.46, S.; over Scotland the winds were from the east and northeast, over Ireland from the north and northeast, and over northern France from the west and southwest. 14th, central over the southern portion of the North Sea; northwest winds, increasing to gales, prevailed over Scotland and Ireland, and northwest to southwest winds over England and northern France. The pressure rose gradually over the British Isles, but threatening or rainy weather still continued. 15th, central over Denmark; Copenhagen, 29.58, NE. rain; Vestervig, 29.65, NNE. rain; Faröe, 29.79, W. rain. 16th, depression gradually filled up over northern Germany as low area No. V covered the southern portion of the British Isles. No. XI, first appeared on the 17th over southwestern Russia; Nikolaiev, 29.57, SW. rain; Kieff, 29.33, NNW. rain; Lugan, 29.47, SW. 18th, passed northeastward, central near Moscow; barometer, 29.37, NNW.; Lugan, 29.48, WSW.; Kieff, 29.60, W.; Krotkowo, 29.48, W.; Kasan, 29.46, SE. 19th, passed eastward to near Orenburg; Kasan, 29.54, SSW.; Krotkowo, 29.64, W.; Ekaterinburg, 29.54, S. 20th, central northeast of the Sea Aral; Ekaterinburg, 29.58, W.; Tashkend, 29.55, SE. 21st, central north of Balkash Lake; Tashkend, 29.46, NW.; Barnaul, 29.35, S.; Yeniseisk, 29.51, E. 22nd, central near Barnaul, barometer, 29.32, SW.; Yeniseisk, 29.43, NE. 23rd, central near Yeniseisk, barometer, 29.40, calm; Barnaul, 29.33, calm. 24th, depression disappeared to the eastward; Yeniseisk, 29.52, NW.; Barnaul, 29.60, calm. The course of this area after leaving southern Russia, as indicated upon the chart, is quite doubtful, its progress to the southeastward being over a territory from which only the most scattering and irregular reports are received. No. IV, first appeared on the 2nd in eastern Russia; Kasan, 29.27, SE. rain; Krotkowo, 29.30, NW., threatening; Ekaterinburg, 29.41, W.; the isobar of 29.40 apparently covered the whole of northwestern Siberia; Barnaul, 29.41, S. 3rd, central near Ekaterinburg, barometer, 29.22, E.; Kasan, 29.32, NW.; Krotkowo, 29.38, NNW; depression more decided, but extent of low area somewhat circumscribed. 4th, central in the Valley of the Obi; Ekaterinburg, 29.06, SW.; Kasan, 29.45, N.; Krotkowo, 29.53, NNW. 5th, depression passed slowly eastward, gradually filling up; Ekaterinburg, 29.47, W.; Barnaul, 29.56 SE.; Yeniseisk, 29.74, SSW. 6th, central northeast of Barnaul disappearing on the following day over eastern Siberia; Barnaul, 29.59, NW.; Yeniseisk, 29.70, SE. 7th, Barnaul, 29.90, WNW.; Yeniseisk, 29.67, WNW. The storms on the Asiatic coast are described as follows. No. IX.—On the 13th the barometer at Peking (29.67) showed a change of —0.16 inch in the past 24 hours, air calm, rain; at stations to the southward, along the China coast, the pressure was below 29.80, and southerly winds prevailed: Vladivostock, 29.69, SE. 14th, central near Peking, barometer, 29.33, calm; Vladivostock, 29.75, SE.; conditions to southward same, except lower pressure, viz: below 29.70. 15th, central north of the Corea Peninsula; Peking, 29.40, SW.; Vladivostock, 29.83, SSE rain and fog; at Shanghai wind still southerly, with slowly falling pressure. 16th, course north-northeast, depression filling up; Peking, 29.59, NW.; Vladivostock, 29.86, SE. light rain; rainy or threatening weather, with southerly winds and rising pressure, prevailed over the Japan Islands and to the northward, barometer at Nikolaievsk on the Amoor, 29.57, NNW. 17th, course nearly due north over the Province of Manchoovia; Nikolaievsk, 29.71, calm; Vladivostock, 29.74, SE. high, rain and fog. 18th, central west of Okhotsk Sea; Nikolaievsk, 29.46, SE. threatening; Vladivostock, 29.65, SE. heavy fog. 19th, central over the Okhotsk Sea, course eastward, Nikolaievsk, 29,53, calm; Vladivostock, 29.64, SSW. 20th, central over the Kamtchatka Peninsula, course still east; Nikolaievsk, 29.69, W. fair; Vladivostock, 29.72, WSW. fair. On this day and the following depression disappeared to the eastward over Kamtchatka Sea. The course of this storm, as traced upon the chart from the 15th to the 18th, is very uncertain, owing to isolated and irregular reports. No. XIV.—On the 23rd the barometer began falling over the Provinces north of the Yellow Sea; Vladivostock, 29.72, ESE.; Peking, 29.57, calm. 24th, central north of the Japan Sea, course eastward; Vladivostock, 29.44, SE. heavy rain; Peking, 29.63, calm. 25th, course eastward across the northern portion of the Japan Sea, thereafter disappearing over the ocean; Vladivostock, 29.73, ENE. cloudy. During the progress of

this area of but slight energy, the pressure at Japanese stations remained almost stationary, accompanied by southerly winds. No. XVII.—On the 28th the barometer began to fall at all stations along the China coast south of Peking, accompanied by southerly winds, with fair to threatening weather. 29th, central west-southwest of Peking; barometer, 29.50, calm, rain; Zi-Ka-Wei, 29.59, E. fair. 30th, central south of Peking, course southeastward, barometer 29.43, N. fair; Zi-Ka-Wei, 29.54, NE. cloudy. 31st, central over the Yellow Sea, course eastward; Peking, 29.55, calm; Zi-Ka-Wei, 29.36, WSW. threatening; at other stations further south along the China coast the winds shifted southwest and west with rising barometer. Over the Japan Islands the pressure rose slightly with southeast to southwest winds. A further consideration of this storm will probably appear in the *July* REVIEW.

Ocean Ice.—Steamers *Nestorian*, *Mississippi*, *Riverdale* and *Quebec*, June 16th, reported large quantities in the Straits of Belle Isle, compelling the two last named vessels to take more southern passage. Schooner *Reuben*, J. Hart, master, bound from Conception Harbor for Labrador, struck huge ice-floe, on night of June 16th, two miles ENE. of Gull Island, off Cape John. Schooner *Trust*, June 20th, reported heavy ice-floes as far south as the Gravois Islands, off the mouth of White Bay; also an impenetrable wall of ice all along the Labrador coast, turning out to the eastward in latitude 53°, N. Steamer *Iceland* reported, June 21st, heavy ice-floe along the south coast of Labrador. Whole fleet of Newfoundland fishing vessels were arrested in their course northward by a heavy body of ice extending as far south as the White Bear Islands. Yacht *Hoidfisken* reported, May 24th, that during passage from Tromso to Spitzbergen encountered such quantities of ice that voyage could not be made; vessel compelled to return. The captain stated that the ice was setting steadily toward the Russian and Siberian coasts, and instead of new ice he considered that it was the old pack ice of the past winter. The following data is taken from the "Weekly Chart of Floating Dangers," published by F. Wyneken, New York City: April 19th, iceberg passed in 43°, 25′ N., 52°, 25′ W., by S. S. *Donau*. May 2nd, immense fields of ice reported off Cape Breton Island. May 10th, bark *Gananoque* collided with iceberg four miles from Bird Rocks, Magdalen Islands. April 14th, S. S. *Habsburg*, in 47°, 21′ N., 48°, 54′ W., encountered iceberg 80 feet high and heavy drift ice. May 27th, an immense ice-pack, with numerous icebergs of gigantic size, was reported from St. John's, Newfoundland, as passing the eastern coast of that island in a southerly direction, having probably reached latitude 46°, 30′ N., on that date. May 22nd, S. S. *Razoni* collided with heavy ice-floe 40 miles SE. of Gull Island, off Cape John. May 27th, S. S. *Olympia* passed several small icebergs in 42°, 55′ N., 50°, 45′ W.

TEMPERATURE OF THE AIR.

The mean temperature of the air for June, 1881, is shown by the isothermal lines (in red) on chart No. II. The table of mean and comparative temperatures in the right hand corner of the chart shows, in the first column, the average for the month throughout the various districts, as deduced principally from observations taken at Signal Service stations. In the two remaining columns are shown the means for the present month, and the departures of such means from the average for many years. From Lake Superior southeastward to North Carolina, and thence northeastward to the Canadian Maritime Provinces, the temperature is from 2°.7 to 4°.4 below the normal; over the northern half of the Pacific coast, and in the Northern Plateau district, from 1°.3 to 3°.1 below the normal. Elsewhere in the various districts the temperature is from 0°.4 to 5°.1 above the normal, except in the Upper Mississippi valley and South Pacific coast region, where no change is recorded. Mt. Washington is 5°.3 below; Pike's Peak, 7°.4 above, and Salt Lake City, 3°.0 above.

Ranges of Temperature at Signal Service Stations.—Monthly ranges in general varied from 35° to 45° over the country east of the Rocky Mountains, and from 40° to 55° to the westward of that region. The *smallest ranges* were: Key West, 20°; Galveston, Punta Rassa and San Francisco, 21°; San Diego, 23°; Brownsville, Tex., 24°; Cedar Keys, Indianola and Port Eads, 25°; New Orleans, 26; Cape Hatteras, New Shoreham and Eastport, 29°; Cape May, 30°. The *largest* were: Florence, Ariz., 69°; Campo, Cal., 67°; Ft. Davis, Tex., and Ft. Verde, Ariz., 62°; Missoula, Mont., 61°; Ft. Meade, Dak., and El Paso, Tex., 59°. The *daily ranges* varied in the different districts as follows: New England, from 19° at Wood's Holl and New Shoreham to 31° at Boston, Burlington and Springfield; Middle Atlantic states, 18° at Delaware Breakwater to 27° at Washington and 34° at Norfolk; South Atlantic states, 19° at Macon to 26° at Charlotte and Augusta and 27° at Kittyhawk; Eastern Gulf states, 16° at Key West to 22° at Montgomery and 24° at Mobile; Western Gulf states, 16° at Port Eads and Galveston to 22° at Vicksburg and 25° at Little Rock; Rio Grande valley, 22° at Brownsville to 34° at Eagle Pass and Rio Grande City; Ohio valley and Tennessee, 23° at Cincinnati to 28° at Indianapolis and Pittsburg and 29° at Nashville; Lower Lake region, 21° at Toledo to 29° at Buffalo and 35° at Rochester; Upper Lake region, 21° at Grand Haven to 35° at Marquette and 43° at Milwaukee; Upper Mississippi valley, 22° at La Crosse to 28° at Des Moines and 30° at St. Paul; Missouri valley, 27° at Leavenworth to 31° at Yankton and 44° at Ft. Bennett; Extreme Northwest, 30° at Moorhead to 34° at Ft. Buford and 37° at St. Vincent; Northern Slope, 38° at Deadwood and Ft. Keogh to 43° at North Platte and 48° at Ft. Benton; Middle Slope, 25° on summit at Pike's Peak to 38° at Denver and